

## What is the Ketogenic Diet?

The ketogenic diet is a recognised and proven therapy for epilepsy. It is a diet high in fat and low in carbohydrates, where the body uses fat as its primary source of fuel, instead of glucose (sugar).

When carefully monitored and controlled, the diet can help reduce seizures in two out of three children and may prevent seizures completely in one out of three. Whilst this diet is predominantly used for children, studies have also shown positive outcomes in adults with medication resistant epilepsy.

Following the ketogenic diet requires a team approach; including doctors, nurses and dieticians for support and education. It can be difficult to adhere to and requires commitment as well as side effects to be monitored. Sometimes blood and urine tests are done.

No single mechanism is likely to explain the antiepileptic effects of the ketogenic diet, but they are mostly related to complex metabolic changes in the body associated with the diet.

## How the diet affects the body

Our bodies usually run on energy which we get from glucose in food. Our body can't store large amounts of glucose, and we only have about one day's supply. Sometimes the ketogenic diet is commenced by a period of fasting, so our body uses up any stored glucose.

Then, the body begins to run on the energy from our fat supplies. When our body burns fat, it creates molecules called ketones. Scientists have understood that these molecules somehow cause a change in metabolism that leads to a strong anticonvulsant effect. The ketogenic diet keeps this process going and forces the body to burn fat 24 hours a day.

The diet provides most of its energy from fat. The rest comes from carbohydrates and protein. Each meal has about four times as much fat as protein or carbohydrate. A breakfast meal example might include scrambled eggs with full fat cream, cheese, and butter and a small serving of strawberries. Water is most commonly recommended for fluid intake.

## Who is the ketogenic diet for?

Currently, the ketogenic diet is predominantly used in children with poorly controlled seizures. The diet may help to reduce the number or severity of seizures and can often have positive effects on behaviour.

## Starting the diet

This process may differ in various institutions. If the fasting approach is used, the diet is started under close medical supervision in hospital. It begins gradually and is increased to the full amount over a 3 to 4-day period. During this time blood sugar and ketone levels are monitored.

## How soon does it to work?

It is difficult to predict. The diet may become effective immediately or can take several months. Each child is unique and has different seizure patterns. However, there is usually some improvement within the first few weeks on the ketogenic diet. Improvement in behaviour will be also seen in some children.

Follow up includes regular monitoring and keeping a seizure diary. The child's cognitive development and behaviour should be noted as well, because sometimes these can improve (even without change in seizure frequency).

### **Will medications be stopped?**

Medications will continue as normal unless changed by the neurologist. There may be a review of the medications if the diet is successful in controlling the seizures.

### **Are there any side-effects?**

Any beliefs that the diet is "holistic" or "all-natural" are incorrect. The diet is not without side effects. Gastrointestinal complaints are most common and include constipation and worsening of reflux, diarrhoea and abdominal cramps. Weight loss or gain may also occur. Speak to your doctor about various side effects of this diet.

### **Vitamin supplementation**

The diet alone is inadequate in many vitamins and minerals. The ketogenic diet provides only small amounts of fruits, vegetables, grains, milk and cheese, so supplementation is essential. Low-carbohydrate multivitamin and mineral supplements should be taken daily.

### **Discontinuing the diet**

Children, for whom the diet has been effective, can stay on the diet for about two years. The diet may be discontinued if the side effects are not tolerated, the family does not feel that the diet is worth the effort, or it is too difficult to maintain.

Like discontinuing medications, the diet must be gradually weaned with the supervision of your doctor and dietician. Some children remain seizure free after transitioning back to a regular diet.

### **Other diets**

Regardless of the efficacy of the ketogenic diet, most people discontinue the diet because of its unpalatable and restrictive features.

In the last 20 years, new variants of the diet have emerged, including the Modified Atkins diet (MAD), a the Low-GI diet.

### **Modified Atkins Diet (MAD) for adults and children**

The ketogenic diet can be difficult to follow, so you may want to transition your child to a less structured diet as they get older. The MAD aims to provide increased flexibility and palatability, and contains around 65% fat, 25% protein, and 10% carbohydrate. It does not require weighing food on a gram scale, or restriction of calories, protein or liquids.

MAD has shown to be effective in the treatment of medication resistant epilepsy with some studies showing similar effectiveness as the classic ketogenic diet. It has also shown to reduce seizures in some adults with epilepsy as well.

The MAD has been shown to be better tolerated than the classical ketogenic diet, but some typical side effects such as gastrointestinal complaints, elevated blood lipids and weight loss are reported. Beneficial effects have also been reported, such as mood improvement.



## Low Glycaemic Index (GI) Diet for adults and children

The low GI diet does not necessarily cause ketosis and may instead reduce seizures by lowering glucose levels in the blood and possibly in brain cells. This alternative diet treatment contains 60% fats, 30% protein, and 10% carbohydrates with a low glycaemic index (GI).

Compared to classic the ketogenic diet, this diet produces a smaller increase in ketone body levels, but most likely has comparable effectiveness, better tolerability and is easier to follow. However, this diet has not been studied as extensively in people with epilepsy.

Constipation and vomiting are the most common side effects reported.

**While still restrictive compared to a "normal" diet, the MAD and Low GI diets are easier to follow and incorporate into normal life and are also used in adults**

## Summary

Evidence shows that ketogenic diet and its variants are a good treatment alternative for people with medication resistant epilepsy of any age. The less-restrictive and more-palatable diets are usually better options for adults and adolescents.

## Further information:

EAA Videos – Dr Andrew Bleasel – [Diet Therapies for Epilepsy](#)

[The Charlie Foundation Ketogenic Therapies](#) – Set up by Charlies parents whose seizures were successfully controlled by the diet.

[Matthews Friends – Ketogenic Diet Therapies](#)

Hans Van der Wiel has developed a software program to assist with the equations of measuring foods. Recommended by other parents. Go to <http://ketosoft.com/>

## References:

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John Hopkins Medicine. (2008) Modified Atkins Diet. Accessed June 2020 [https://www.hopkinsmedicine.org/news/media/releases/Modified\\_Atkins\\_Diet\\_Can\\_Cut\\_Epileptic\\_Seizures\\_in\\_Adults](https://www.hopkinsmedicine.org/news/media/releases/Modified_Atkins_Diet_Can_Cut_Epileptic_Seizures_in_Adults)

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